
FISHING
FOR A RECOVERY
Planet Tracker
September 2023

GLOBALLY, AT LEAST 65 FISHERIES COULD BENEFIT FROM A BLUE RECOVERY BOND

where fishers are paid to temporarily fish less in order to recover fish populations

COULD YOUR FISHERY BENEFIT TOO?

FIND OUT BY USING OUR **INTERACTIVE TOOL**

CONTENT

EXECUTIVE SUMMARY

Along the coast of Chile's Valparaíso region, a quiet revolution is ongoing. Seven years ago, a community of fishers in Maitencillo voluntarily decided to set aside 19% of the area they normally fished for marine conservation. Establishing a grassroots marine reserve was a difficult decision that cost them money initially but it paid off, with a rapid increase in abundance and size of many marine species. Since then, four more neighbouring communities have emulated this success and there too, in only two years, positive change has been noted, with fish returning to areas they were previously absent from.

This report argues that investors should financially support this kind of initiative, and provides a methodology and interactive tool **to determine whether any given fishery would be a good candidate for an investment in the recovery of fish stocks.** These initiatives are needed: whilst fisheries management support the long-term sustainability of fish populations, it has in many cases failed to sustain ecologically viable fish stocks or recover those already depleted.

As the Chilean example above shows, fishers understand how they rely on their local ecosystems and are therefore a key stakeholder to solve the overexploitation problem. Incentive-based resource management can promote the recovery and long-term sustainability of marine fish populations.

This can be done, for instance, via a Blue Recovery Bond whereby **investors provide upfront capital to a fishery to support a temporary period of decreased fishing effort**.

> **"In this report, we developed a theoretical framework that can be used to evaluate the suitability of a marine fishery for participation in a Blue Recovery Bond programme".**

We evaluated 295 fisheries against a subset of the 19 criteria that we hypothesize are correlated to Blue Recovery Bond 'candidacy'. Out of them, **65 fisheries (22%) proved to be strong Blue Recovery Bond candidates**. Most of them operate in the North Atlantic, North Pacific and South Pacific, although this is skewed by data availability constraints.

While this work contributes to understanding how to assess the suitability of fisheries for a Blue Recovery Bond, fishery stakeholders are of course best positioned to evaluate their own fishery. We encourage them to **use our interactive tool to determine whether a given fishery is a suitable candidate for a Blue Recovery Bond** and the upfront capital it would provide.

WHY A BLUE RECOVERY BOND?

Economic incentives in the context of overexploited fisheries

According to the Food and Agriculture Organization (FAO), approximately 35.1% of the world's fisheries are overfished, a trend which has generally increased since the 1980s[1] – see Figure 1. Fisheries management can support the long-term sustainability of these stocks,[2] but in many cases still fails to sustain ecologically viable fish stocks or recover those already depleted.[3]

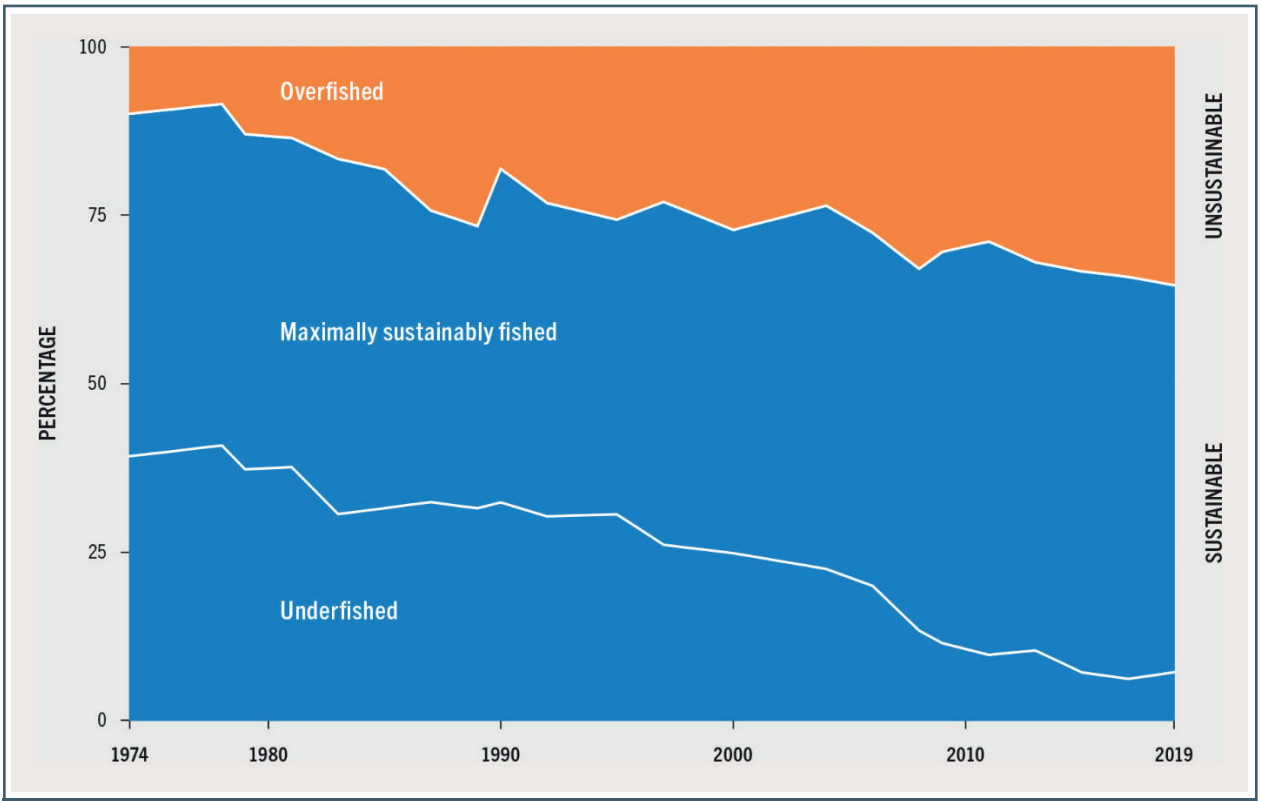


Figure 1. *Global trends in the state of the world's marine fish stocks (1974-2019). Approximately 35.1% of the world's fisheries are overfished, a portion of global catching that has been increasing since the 1980s (Source: FAO)[1].*

The demand for seafood is projected to rise to 267.5 million tonnes by 2050, up from 157.4 million in 2020.[4] Whilst many hope that aquaculture will supply much of this growth,[5] the demand on marine fisheries resources is set to grow, pushing many fish stocks further towards, and into, unsustainability. This will increase the risk of food insecurity[6] and likely further damage marine ecosystem integrity and resilience in many areas, particularly lesser developed regions.[6] Note that Planet Tracker does not see aquaculture as the silver bullet to rising global demand for seafood. Please see '**Avoiding Aquafailure**'.

Economic incentives in fisheries

Economic incentives, such as catch shares – a system that dedicates a secure share of fish to individual fishers, cooperatives or fishing communities for their exclusive use[7]– have been shown to prevent and, in some cases, reverse fisheries collapse.[7, 8] Incentive-based resource management may therefore be a useful path to fisheries sustainability in certain cases.[9] For instance, the use of Individual Fishing Quotas (IFQs) in the West Coast Groundfish Fishery in the United States helped to realign economic incentives among fishers to reverse the overexploitation of groundfish stocks and support their recovery.[10] Accordingly, interest in conservation finance approaches to recover depleted fish stocks is gradually increasing.

By raising and managing capital, conservation finance can support the conservation of marine resources in different ways, varying by source of capital (public, private or nonprofit funders), type of capital (e.g., loans, grants, tax incentives, market mechanisms) and scale of capital (blended, corporate, municipal, state, federal and supranational).[11] Leading conservation organisations, such as World Wildlife Fund for nature (WWF), The Nature Conservancy (TNC) and International Union for the Conservation of Nature (IUCN) are now using conservation finance efforts to avert the climate crisis and reverse biodiversity loss. Similarly, many investment banks and hedge funds are now increasingly engaged with conservation finance ventures[11] and many 'blue funds' have been launched (e.g. the Credit Suisse Rockefeller Ocean Engagement Fund, Ocean 14 Capital, Bonafide Global Fish Fund, etc.).

Blue Recovery Bonds vs. Blue Bonds

Blue bonds

Blue bonds are a relatively new investment vehicle that falls under the conservation finance umbrella.[12] Like conventional bonds, investors lend money to a bond issuer, who agrees to repay the interest every year for the term of the bond plus the capital. Earnings are typically generated from the investments in sustainable blue economy projects. Blue bonds can be issued by governments, banks or corporations.[12, 13]

The first application of a blue bond to support sustainable marine and fisheries projects was a collaboration between the World Bank, TNC and the government of Seychelles in 2018.[14] The Seychelles' Sovereign Blue Bond supported the expansion of sustainable-use marine protected areas, improved government of priority fisheries and sustainable development of Seychelles blue economy.[14, 15] Despite the many challenges that arise with any blue bond programme, early indicators of Seychelles' 10 year blue bond programme shows that it succeeded in protecting 86 million acres of ocean, exceeding the goal to protect 30% of Seychelles' Exclusive Economic Zone (EEZ) and Territorial Sea by 2020.[16]

Since then, blue bond frameworks have been applied as an innovative and promising approach to improve marine area management and create new marine protected areas, improve fisheries sustainability and benefit local coastal economies in other regions, including the Caribbean, Latin America and Asia-Pacific.[16, 17] The funds raised by blue bonds are not always 100% invested in ocean protection.[18] To avoid 'bluewashing', a blue bond guidance was recently released.[19]

The Blue Recovery Bond

A concept developed by Planet Tracker, a Blue Recovery Bond focuses on the recovery of overfished fish stocks.[20] Investors provide up-front capital investment to a group of collaborating fishers, who agree to reduce or stop fishing for a pre-agreed period to allow a fish stock to recover – see Figure 2. This capital would subsidise the difference in free cash flow compared to a "business as usual" fishing activity.

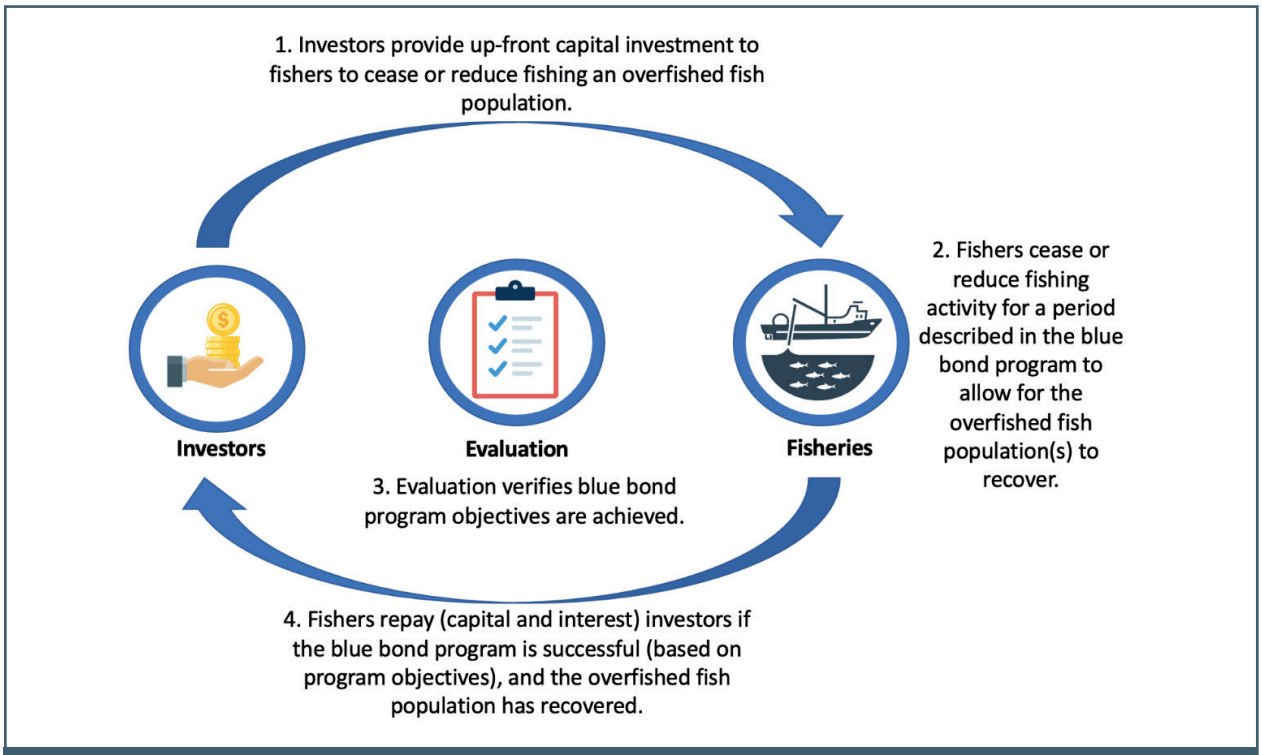
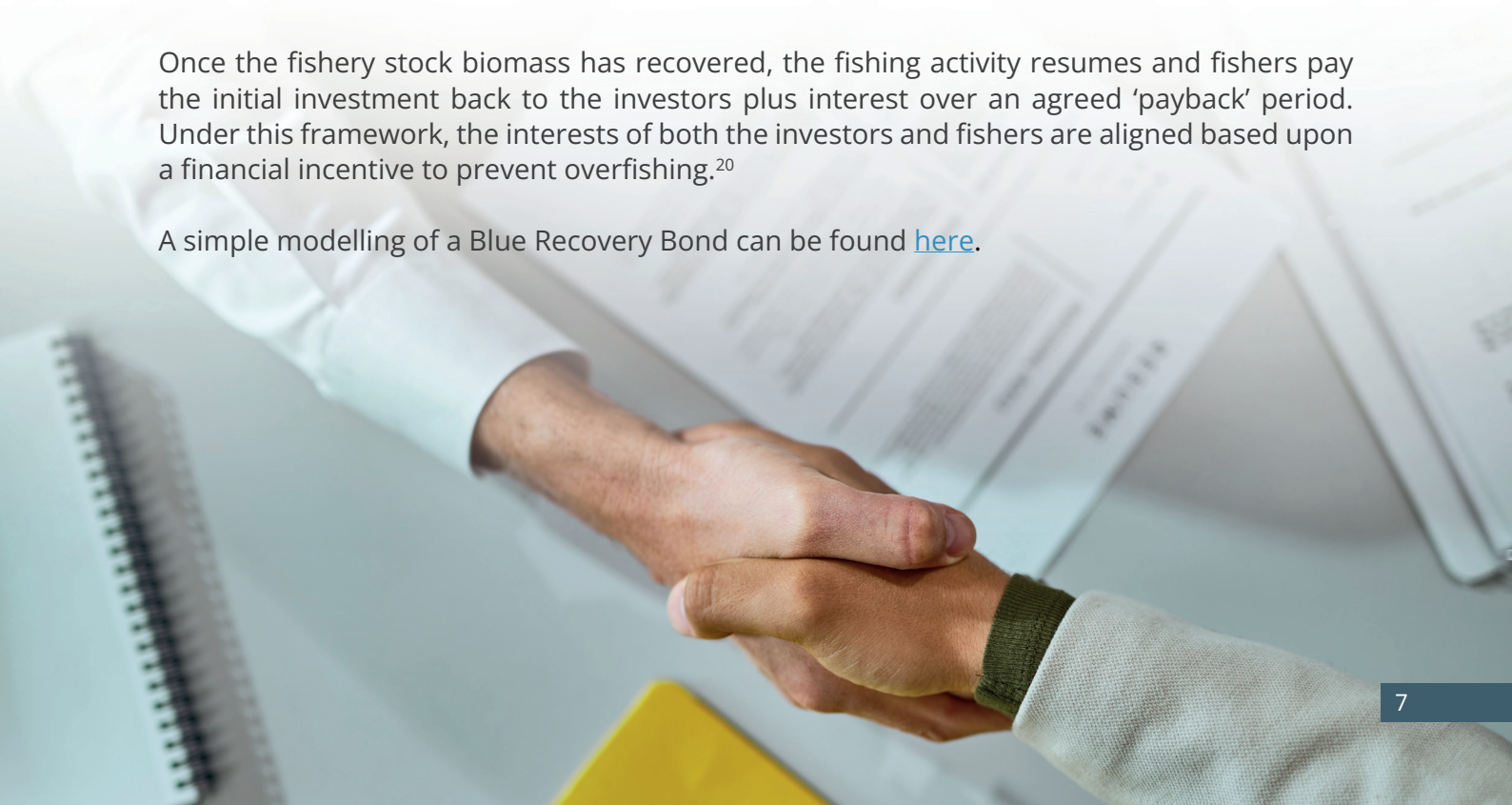


Figure 2. *Diagram of a Blue Recovery Bond program applied to recover overfished fish populations (Source: Planet Tracker).*

Once the fishery stock biomass has recovered, the fishing activity resumes and fishers pay the initial investment back to the investors plus interest over an agreed 'payback' period. Under this framework, the interests of both the investors and fishers are aligned based upon a financial incentive to prevent overfishing.[20]

A simple modelling of a Blue Recovery Bond can be found here.



Benefits and challenges of Blue Recovery Bonds

In theory, Blue Recovery Bonds enable fishers to conserve their depleted fish stocks without having to forfeit their incomes and enable investors to fulfill their Environmental, Social and Governance (ESG) and/or general sustainability goals, as well as generate financial returns.

However, like many bond issuances and sustainable bond issuances in particular, Blue Recovery Bond projects face challenges, including:

- finding the right bond issuer agreement;
- establishing methods to measure success;
- implementing appropriate monitoring and enforcement of performance, and
- overcoming a range of potentially negative social and economic impacts on supply chains.

Fisheries are inherently complex. They often include many different actors with differing interests and goals. The population dynamics and recovery potential of fish stocks are also often highly uncertain, and political landscapes and power dynamics can be equally multi-faceted. The use of Blue Recovery Bonds to support the recovery of overfished stocks therefore still pose substantial risks for investors and participating companies. It is therefore crucial to mitigate as much of that risk as possible upfront in order to maximise chances of success.

A Blue Recovery Bond framework

This report describes a theoretical framework that can be used to evaluate the suitability of a marine fishery for participation in a Blue Recovery Bond programme. Using the framework, we evaluated 295 fisheries globally against a subset of the criteria that we hypothesize are correlated to Blue Recovery Bond 'candidacy'. Our interactive assessment tool allows fishery stakeholders to do the same for any fishery.

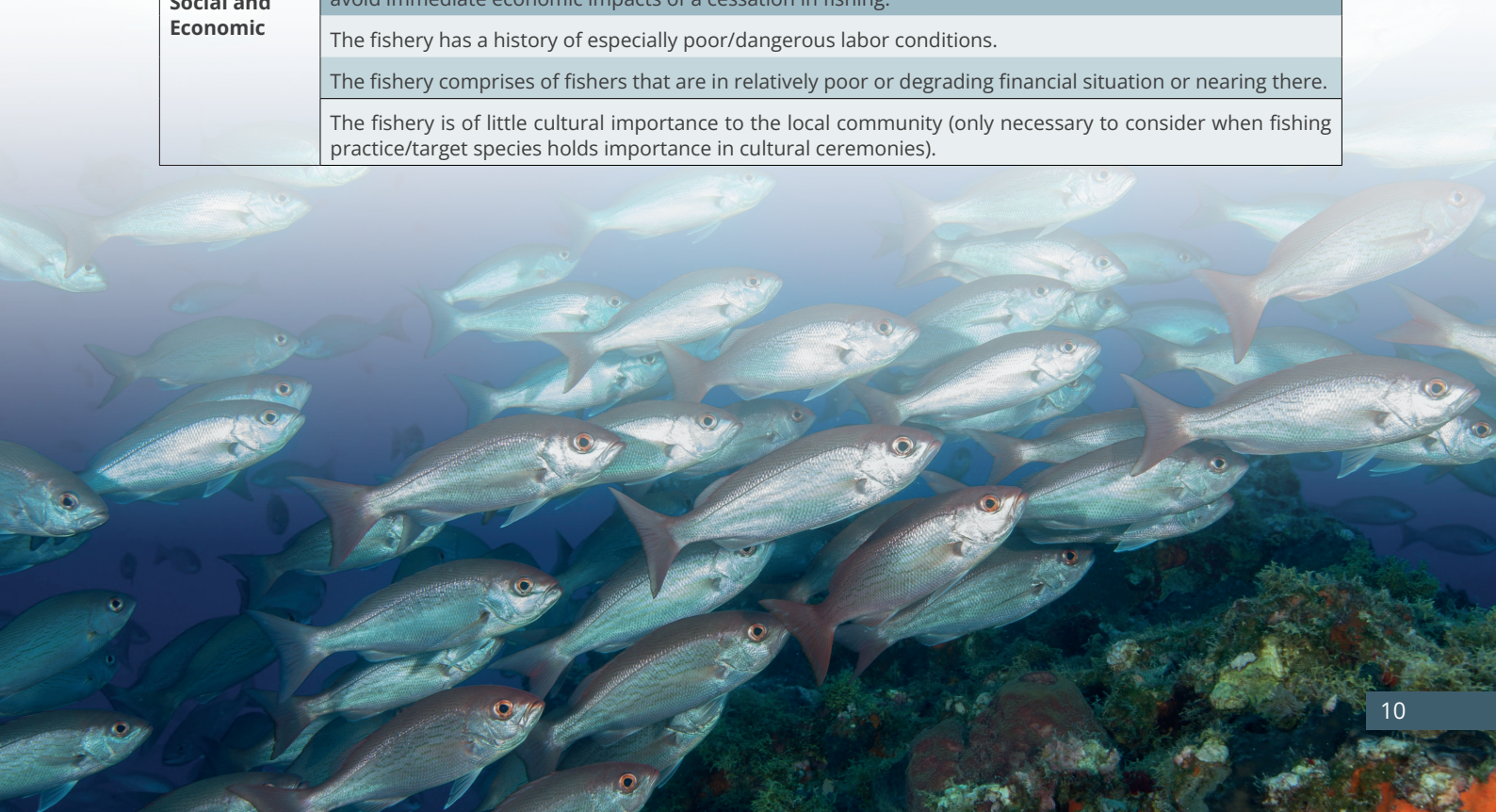
Scoping criteria

To design a theoretical framework that can rigorously evaluate the suitability of a fishery to undertake a Blue Recovery Bond scheme for stock recovery (herein referred to as "Blue Recovery Bond Candidacy"), we identified 19 criteria divided into 6 categories – see Table 1. We drew on expert knowledge from different fisheries' stakeholders, as well as conversations with conservation finance practitioners.

Each criterion is weighted by the hypothetical importance (low, medium or high) that each has over Blue Recovery Bond candidacy assuming what we consider an average fishery scenario. However, since not all fisheries are alike, these weights may vary across fisheries and consequently may be reconsidered on a case-by-case basis (see *Methodological limitations*).

Table 1. *Description of the 19 criteria used to evaluate the suitability of a fishery as a Blue Recovery Bond candidate. Criteria are organized into six categories. Each criterion is weighted by hypothetical importance or influence over Blue Recovery Bond candidacy assuming an average fishery (the darker the shading, the more important the criterion). (Source: Planet Tracker)*

Category	Criterion - What makes a good Blue Recovery Bond candidate fishery?
Fishery Size & Operations	A fishery that comprises of a limited number of fishing vessels / operators.
	A fishery that comprises a limited number of management jurisdictions/units (beach management units, cooperatives, regions, countries.)
Target Species	The current population status of the target species is relatively well known (through stock assessments or local ecological knowledge).
	The population status of the target species is concerning/deteriorating.
	The target species is part of the main diet of local communities.
	The full spatial distribution of the target species is within the spatial extent of the fishery's operations (the target species is not a highly migratory species).
	The target species exhibits life history traits (fecundity, age of maturity, lifespan) that facilitate stock recovery.
Bycatch and Ecosystem Impacts	The fishery causes persistent habitat or ecosystem damage.
	The fishery causes persistent bycatch (non-target stock impacts).
Management and Monitoring	A fishery in which human and/or electronic monitoring is either in place or in the process of being rolled out.
	The target species is not a high risk of illegal, unreported, unregulated (IUU) fishing.
	A fishery where the local authorities (RFMOs, country jurisdiction, local tribal rules, social norms) are at least relatively good at enforcing management measures/monitoring laws.
Relationships	A fishery in which managers follow scientific advice.
	A fishery that can/does trust the management body
Social and Economic	The fishery supports a short supply chain (or minimal number of individuals) with minimal contribution to international export.
	Alternative livelihood options (i.e. fishing for other species or working in other types of work) are in place to avoid immediate economic impacts of a cessation in fishing.
	The fishery has a history of especially poor/dangerous labor conditions.
	The fishery comprises of fishers that are in relatively poor or degrading financial situation or nearing there.
	The fishery is of little cultural importance to the local community (only necessary to consider when fishing practice/target species holds importance in cultural ceremonies).



It may be difficult to obtain enough data and / or information about a fishery to evaluate its Blue Recovery Bond candidacy using the full list of 19 criteria. Since there is likely correlation between different criteria within the list (for instance between fisheries that follow scientific advice and those where the status of the target species is deteriorating), it is likely that criteria may be removed from it without impacting the robustness of an evaluation.

In our interactive assessment tool, users can choose to answer only the questions for which they have data and still obtain a candidacy score.

Scoring system

Among the 19 criteria, 9 are binary (yes/no) (e.g., *the current population status of the target species is relatively well known*) and 10 criteria are continuous variables (e.g., *the number of vessels*). While each criterion has its respective units, all criteria are scored according to a 5-point Likert scale[1], where 1 is bad (not good for the implementation of a Blue Recovery Bond scheme) and 5 is good (good for the implementation of a Blue Recovery Bond scheme). For binary criteria, a score of 1 represents 'no' and a score of 5 represents 'yes'. For continuous criteria the relative range of units are derived from the estimated or actual maximum and minimum values and then transformed to the 5-point Likert scale, where each score contains an equal range of units of the respective criterion - see Figure 3.

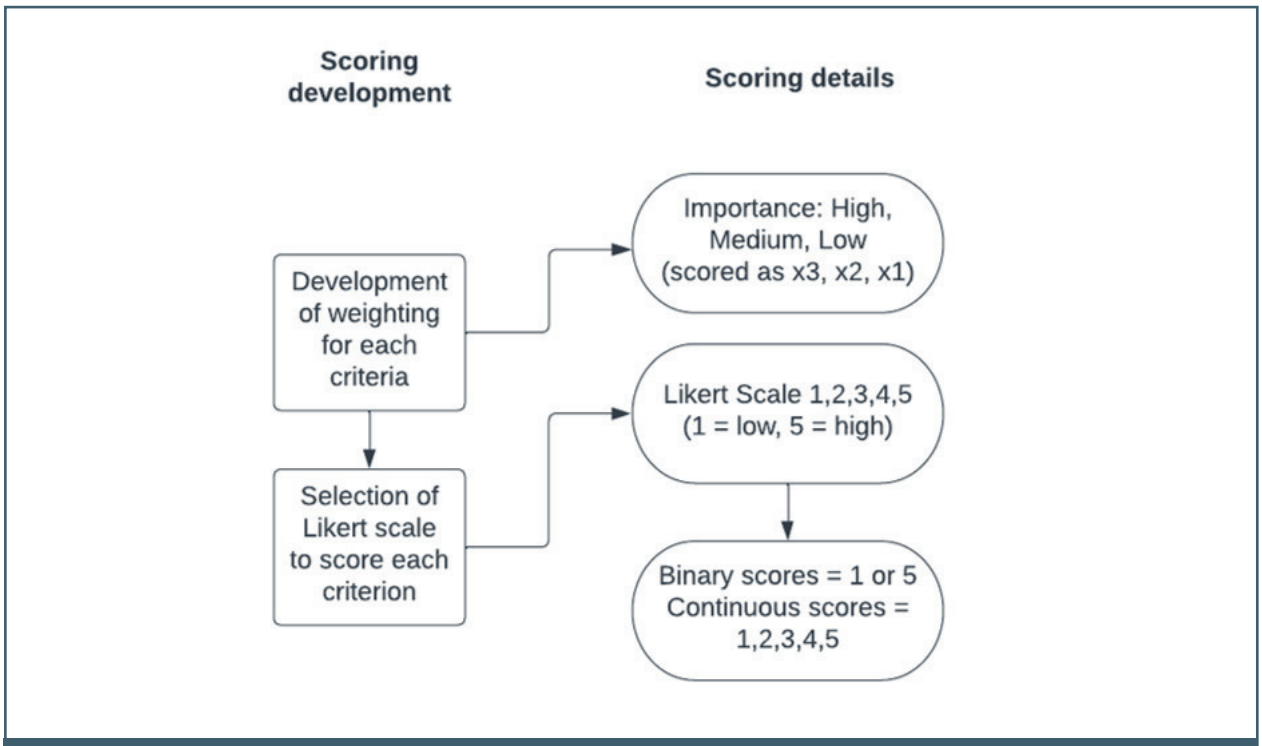


Figure 3. *Scoring system used for the Blue Recovery Bond framework (Source: Planet Tracker)*

1 A **Likert scale** is a psychometric scale named after its inventor, American social psychologist, Rensis Likert, which is commonly used in research questionnaires.

A weighted arithmetic mean is used to aggregate and compute scores for

1) each category for a given fishery to understand how a fishery performs in each category (a total of six scores, one for each category) and
2) across all categories to understand how a fishery performs overall (one score across all six categories). This overall statistic can be used to compare a fishery's Blue Recovery Bond candidacy relative to other fisheries.

Whilst it is preferable that all criteria are scored for a fishery, this is not always possible because of data limitations. In such cases, a reduced subset of the criteria may be used to score Blue Recovery Bond candidacy (see *'How to evaluate your fishery for Blue Recovery Bond candidacy'*). This can be done via our interactive assessment tool.

TESTING THE FRAMEWORK: GLOBAL SCOPING OF 295 FISHERIES

Testing the framework with limited data availability

Using the framework developed herein, we evaluated the Blue Recovery Bond candidacy of 295 fisheries. Given the challenges of accessing all the necessary data to evaluate each fishery we focused only on the nine criteria whose importance we rated high and, within those, only on those that were readily available in a harmonised and standardised format. We drew from the FishSource fisheries score global dataset (known herein as the FishSource global dataset) which compiles scientific and technical information about the status of wild capture fisheries.[21] The FishSource global dataset contains scores for fisheries in every region globally, but it does not measure all the criteria within the refined list - the FishSource global dataset contains four of the nine criteria in the refined list:

- fisheries' current stock health,
- management quality,
- management compliance,
- fisher compliance.

We also calculated the number of management units each fishery operates to add a fifth criterion, but only by counting the number of FAO subregions for each.

Due to data availability constraints, there is disparity in the number of fisheries evaluated across marine ecoregions. Consequently, more fisheries operating in northern marine ecoregions were evaluated for Blue Recovery Bond candidacy than in southern marine ecoregions - see Figure 4.

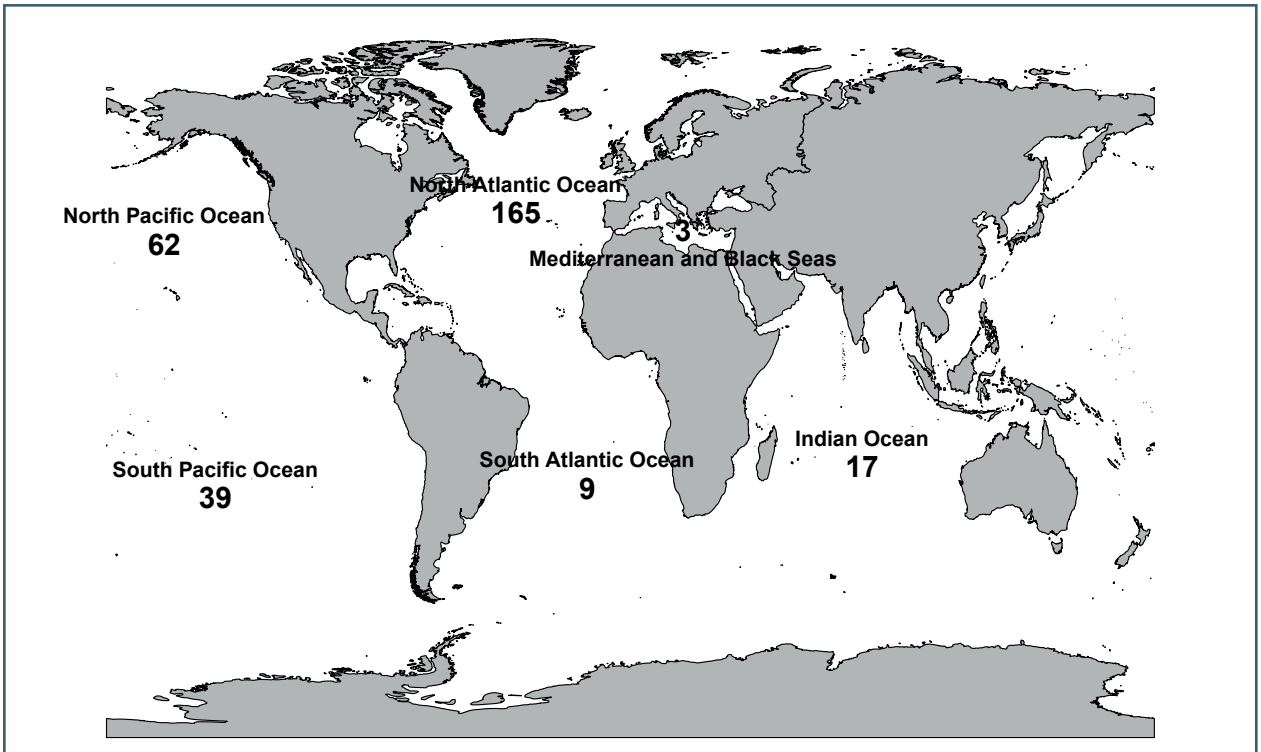


Figure 4. *Number of fisheries included in the FishSource global dataset to evaluate Blue Recovery Bond candidacy marine ecoregion (Source: Planet Tracker, based on FishSource data)*

Assessing Blue Recovery Bond candidacy globally

For each fishery, we calculated individual scores for each of the 5 criteria – see Figure 5A-E. Using these derived statistics for each fishery, we also calculated a combined weighted average score for the five criteria – see Figure 5F.

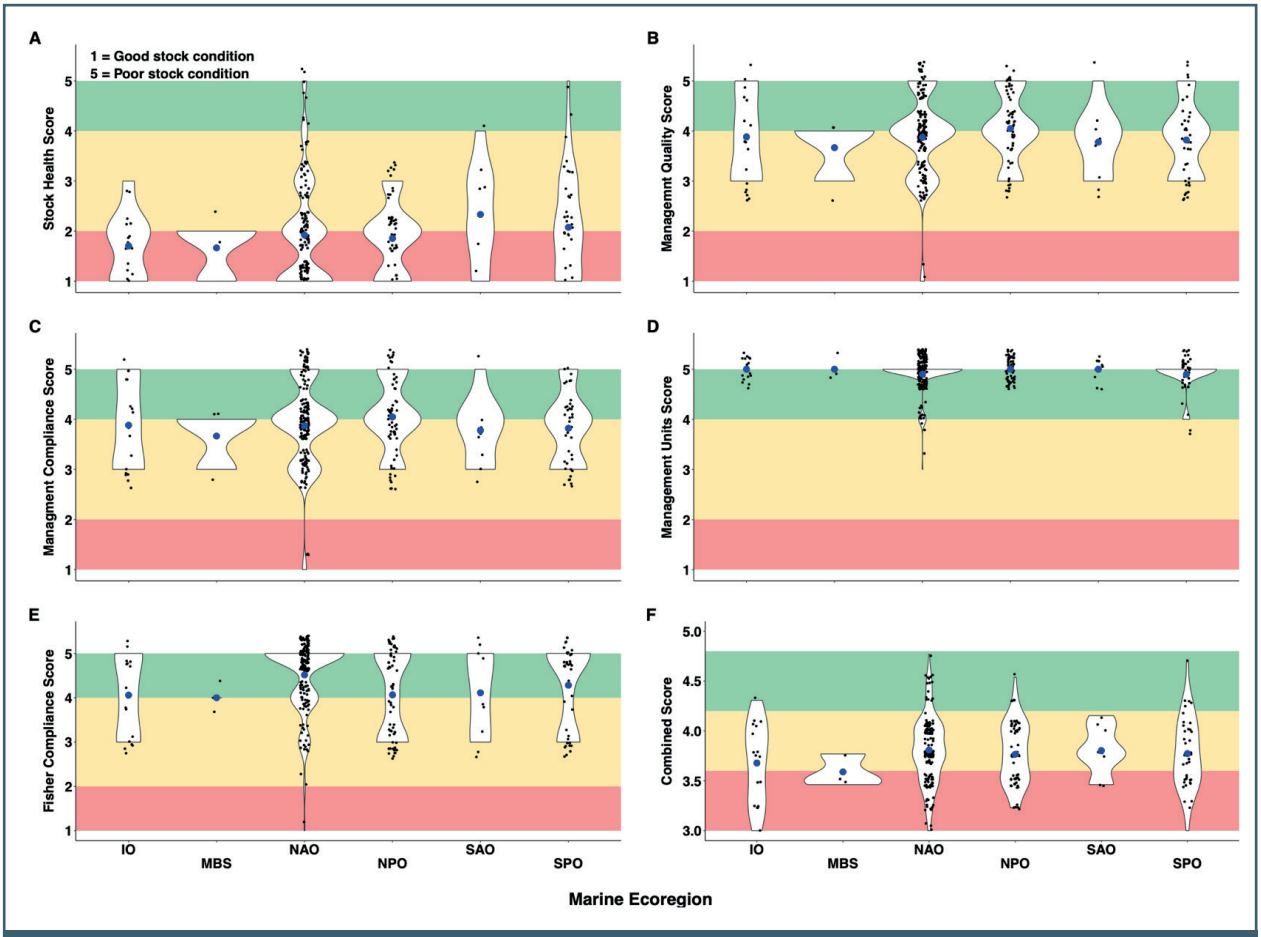


Figure 5. *Evaluation of Blue Recovery Bond candidacy for fisheries included in the FishSource global database based on stock health (A), management quality (B), management compliance (C), management units (D), fisher compliance (E), and combined scores (F). Violin plots display individual fishery scores (black points) and mean scores (blue points) for each criterion by marine ecoregion. Black points are jittered to avoid overlapping and the violin plots outlines the density of the black points. For marine ecoregions with no violin plot outline, all black points share the same score. IO = Indian Ocean, MBS = Mediterranean and Black Sea, NAO = North Atlantic Ocean, NPO = North Pacific Ocean, SAO = South Atlantic Ocean, SPO = South Pacific Ocean. Background shading in each panel indicates a given fishery's candidacy with respect to the given criterion, where red represents poor, yellow represents fair and green represents strong Blue Recovery Bond candidacy. (Source: Planet Tracker, based on FishSource data)*

On average, fisheries performed similarly across marine ecoregions[2] for each of the five criteria and for the combined score, highlighting that no one region performed better than another in terms of fishery Blue Recovery Bond candidacy – see Figure 5.

2 A relatively large unit of land or water containing a geographically distinct assemblage of species, natural communities and environmental condition

Across marine ecoregions, fisheries generally scored:

- low for stock health (average score $\bar{x}$ = 1.93 out of 5), meaning the stocks for which there is data on FishSource are on average in good condition (Figure 5A),
- high for management quality ($\bar{x}$ =3.90) (Figure 5B),
- high for management compliance ($\bar{x}$ =3.90) (Figure 5C),
- high for management units ($\bar{x}$ =4.93) (Figure 5D), and
- high for fisher compliance ($\bar{x}$ =3.90) (Figure 5E).

Fisheries across marine ecoregions on average scored high ($\bar{x}$ =3.78), implying that strong Blue Recovery Bond candidates exist in each marine ecoregion (Figure 5F).

Across all marine ecoregions 55.6% of the fisheries assessed were fair Blue Recovery Bond candidates, 22.4% fisheries were poor (score below 3), and 22.0% fisheries were strong Blue Recovery Bond candidates (score above 4). In most of the marine ecoregions, the majority of the fisheries were identified to be fair Blue Recovery Bond candidates - see Figure 6, except the Indian Ocean where a majority of the fisheries were poor Blue Recovery Bond candidates.

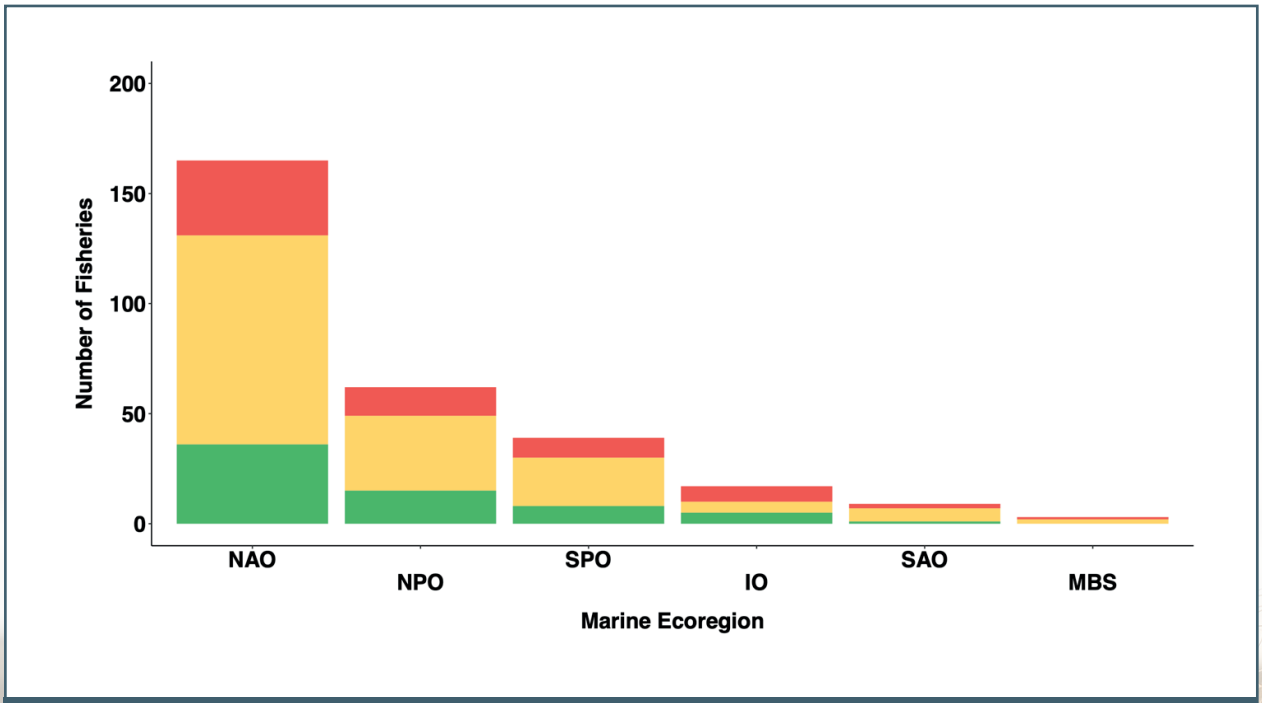


Figure 6. *Number of fisheries identified as poor (red), fair (yellow), and strong (green) Blue Recovery Bond candidates by marine ecoregion. IO = Indian Ocean, MBS = Mediterranean and Black Sea, NAO = North Atlantic Ocean, NPO = North Pacific Ocean, SAO = South Atlantic Ocean, SPO = South Pacific Ocean (Source: Planet Tracker, based on FishSource data)*

List of 65 strong Blue Recovery Bond candidates

A total of 65 fisheries were identified to be strong Blue Recovery Bond candidates - see Table 2:

- 5 in the Indian Ocean (29.4% of IO fisheries),
- 36 in the North Atlantic Ocean (21.8% of NAO fisheries),
- 15 in the North Pacific Ocean (24.2% of NPO fisheries),
- 8 in the South Pacific Ocean (20.5% of SPO fisheries), and
- 1 in the South Atlantic Ocean (11.1% of SAO fisheries).

It is important to note, however, that our scoring system might not be a true representation of the real suitability of a Blue Recovery Bond for these fisheries. In addition, the suitability of these 65 fisheries as Blue Recovery Bond candidates is contingent on their willingness to participate, a measure for which is not currently included in the analysis.

To truly evaluate Blue Recovery Bond candidacy in a fishery, it is important to look at fisheries on a case-by-case basis and not to rely solely on a combined average scoring. That is why we encourage fishery stakeholders to use our interactive assessment tool.

Table 2. *List of 65 strong Blue Recovery Bond candidate fisheries (based on a preliminary assessment with a limited number of criteria assessed). Note: the combined score is not displayed to avoid the wrong interpretation that a lower relative combined score means that a fishery is less strong a candidate relative to another one. (Source: Planet Tracker, based on FishSource data)*

FishSource Stock Number	Species	Marine Ecoregion	FAO Areas	Stock Health score	Management Quality score	Management Compliance score	Management Units score
1865	Blue grenadier, hoki	Indian Ocean	FAO 57.5.2, FAO 57.6	1	5	5	5
1870	Brown tiger prawn	Indian Ocean	FAO 57, FAO 57.5	1	5	5	5
1871	Deep-water flathead, Deepwater flathead	Indian Ocean	FAO 57, FAO 57.6	1	5	5	5
1920	Pink cusk-eel, pink ling	Indian Ocean	FAO 57, FAO 57.2	1	5	5	5
1929	Silver gemfish	Indian Ocean	FAO 57, FAO 57.2, FAO 57.6	2	5	5	5
689	Atlantic cod	North Atlantic Ocean	FAO 27.5.a	1	5	5	5
748	Boarfish	North Atlantic Ocean	FAO 27.4, FAO 27.6, FAO 27.7, FAO 27.8, FAO 27.9.a	3	5	5	5
755	Caribbean spiny lobster	North Atlantic Ocean	FAO 31	2	5	5	5

FishSource Stock Number	Species	Marine Ecoregion	FAO Areas	Stock Health score	Management Quality score	Management Compliance score	Management Units score
766	Common sole, European Dover sole	North Atlantic Ocean	FAO 27.4	1	5	5	5
777	European pilchard, Sardine, European sardine	North Atlantic Ocean	FAO 27.7.a, FAO 27.7.d, FAO 27.7.e, FAO 27.7.f, FAO 27.7.g, FAO 27.7.h, FAO 27.7.j, FAO 27.7.k, FAO 27.8.a, FAO 27.8.b	2	5	5	4
778	European pilchard, Sardine, European sardine	North Atlantic Ocean	FAO 27.8.c, FAO 27.9.a	3	5	5	5
818	Haddock	North Atlantic Ocean	FAO 27.1, FAO 27.2.b	1	5	5	5
856	Atlantic cod	North Atlantic Ocean	FAO 27.1.b, FAO 27.2.a.2	4	4	4	5
869	Atlantic herring	North Atlantic Ocean	FAO 21.5.Y, FAO 21.5.Z.u, FAO 21.5.Z.w, FAO 21.6.A, FAO 21.6.B	2	5	5	5
1064	Atlantic halibut	North Atlantic Ocean	FAO 21.5.Y, FAO 21.5.Z	5	5	5	5
1068	Atlantic herring	North Atlantic Ocean	FAO 21.4.T	2	5	5	5
1077	Winter skate	North Atlantic Ocean	FAO 21	1	5	5	5
1089	Blue crab	North Atlantic Ocean	FAO 21.6.B	2	5	5	5
1098	Northern prawn, northern shrimp	North Atlantic Ocean	FAO 21.5.Y	4	4	4	5
1119	Saithe	North Atlantic Ocean	FAO 27.1, FAO 27.2	1	5	5	5
1127	Winter flounder	North Atlantic Ocean	FAO 21.5.Z.w, FAO 21.6.A, FAO 21.6.B, FAO 21.6.C	4	5	5	5
1229	Northern prawn, northern shrimp	North Atlantic Ocean	FAO 21.3.M	3	5	5	5

FishSource Stock Number	Species	Marine Ecoregion	FAO Areas	Stock Health score	Management Quality score	Management Compliance score	Management Units score
1247	Atlantic cod	North Atlantic Ocean	FAO 21.3.N, FAO 21.3.O	4	4	4	5
1351	Haddock	North Atlantic Ocean	FAO 21.4.X, FAO 21.5.Y	2	5	5	5
1631	Atlantic cod	North Atlantic Ocean	FAO 21.3.P.n, FAO 21.4.R, FAO 21.4.S	5	3	3	5
1680	Ocean quahog	North Atlantic Ocean	FAO 21.6.A, FAO 21.6.B, FAO 21.6.C	1	5	5	5
1719	Atlantic herring	North Atlantic Ocean	FAO 27.5.a.2	1	5	5	5
1727	Atlantic cod	North Atlantic Ocean	FAO 27.1, FAO 27.2.a, FAO 27.2.b	1	5	5	5
1753	European plaice	North Atlantic Ocean	FAO 27.3.a.20, FAO 27.4	2	5	5	5
1762	Haddock	North Atlantic Ocean	FAO 27.5.a	1	5	5	5
1776	Yellowtail snapper, Gaiúba	North Atlantic Ocean	FAO 31	1	5	5	5
1828	Atlantic herring	North Atlantic Ocean	FAO 27.1, FAO 27.14.a, FAO 27.2, FAO 27.4.a, FAO 27.5, FAO 27.6.a	1	5	5	5
1829	Atlantic herring	North Atlantic Ocean	FAO 27.3.a, FAO 27.4, FAO 27.7.d	1	5	5	5
1830	Capelin	North Atlantic Ocean	FAO 27.1, FAO 27.2	3	5	5	5
1991	Saithe	North Atlantic Ocean	FAO 27.5.a	1	5	5	5
1992	Saithe	North Atlantic Ocean	FAO 27.3.a, FAO 27.4, FAO 27.6	2	5	5	5
1998	Whiting	North Atlantic Ocean	FAO 27.4, FAO 27.7.d	2	5	5	5
2003	Gag, grouper	North Atlantic Ocean	FAO 31	1	5	5	5

FishSource Stock Number	Species	Marine Ecoregion	FAO Areas	Stock Health score	Management Quality score	Management Compliance score	Management Units score
2039	Atlantic herring	North Atlantic Ocean	FAO 27.3.d.25, FAO 27.3.d.26, FAO 27.3.d.27, FAO 27.3.d.28.2, FAO 27.3.d.29, FAO 27.3.d.32	1	5	5	5
2040	Atlantic herring	North Atlantic Ocean	FAO 27.3.d.28.1	1	5	5	5
2154	Atlantic herring	North Atlantic Ocean	FAO 27.3.a, FAO 27.3.b.23, FAO 27.3.c.22, FAO 27.3.d.24	2	5	5	5
674	Arrow-tooth flounder	North Pacific Ocean	FAO 67	1	5	5	5
788	Flathead sole	North Pacific Ocean	FAO 67	1	5	5	5
789	Flathead sole	North Pacific Ocean	FAO 67	1	5	5	5
867	Pacific cod	North Pacific Ocean	FAO 67	2	5	5	5
868	Pacific cod	North Pacific Ocean	FAO 67	2	5	5	5
990	Arrow-tooth flounder	North Pacific Ocean	FAO 67	1	5	5	5
1118	Red king crab	North Pacific Ocean	FAO 67	2	5	5	5
1246	Alaska plaice	North Pacific Ocean	FAO 67	1	5	5	5
1294	Pacific cod	North Pacific Ocean	FAO 67	3	5	5	5
1868	Brown tiger prawn	North Pacific Ocean	FAO 71	1	5	5	5
1890	Rex sole	North Pacific Ocean	FAO 67	1	5	5	5
1926	Indian white prawn, red legged banana prawn	North Pacific Ocean	FAO 71	1	5	5	5
1943	Pacific ocean perch	North Pacific Ocean	FAO 67	1	5	5	5
1947	Pacific ocean perch	North Pacific Ocean	FAO 67	1	5	5	5
1955	Yellowfin sole	North Pacific Ocean	FAO 67	1	5	5	5

FishSource Stock Number	Species	Marine Ecoregion	FAO Areas	Stock Health score	Management Quality score	Management Compliance score	Management Units score
1867	Tristan da Cunha rock lobster, Brazil Tristan rock lobster	South Atlantic Ocean	FAO 47	1	5	5	5
850	Patagonian toothfish	South Pacific Ocean	FAO 48.3	1	5	5	5
1145	Southern bluefin tuna	South Pacific Ocean	FAO 81	5	4	4	5
1409	Orange roughy	South Pacific Ocean	FAO 81	3	4	4	5
1411	Orange roughy	South Pacific Ocean	FAO 81	1	5	5	5
1763	Blue grenadier, hoki	South Pacific Ocean	FAO 81	1	5	5	5
1764	Blue grenadier, hoki	South Pacific Ocean	FAO 81	2	5	5	5
1904	Blue mackerel	South Pacific Ocean	FAO 81	2	5	5	5
1907	Cape bonnetmouth, Redbait	South Pacific Ocean	FAO 81	2	5	5	5

CASE STUDIES OF BLUE RECOVERY BOND CANDIDATE FISHERIES

A fishery will benefit from a Blue Recovery Bond if it has a deteriorated stock but has sufficient behavioral compliance within the fishery that, if a Blue Recovery Bond were to be implemented, fishers and managers would be up to the task of reducing or eliminating fishing during the Blue Recovery Bond period. Few management units would be expected to facilitate a Blue Recovery Bond as it would make the management of the bond and subsequent compliance easier (fewer different geographies, power dynamics and stakeholders to contend with).

To better illustrate differences in Blue Recovery Bond candidacy, we describe three of the 295 fisheries evaluated that varied in their combined Blue Recovery Bond candidacy score (one poor, one fair, and one strong) – see Table 3.

Table 3. *Criterion scores for poor, fair and strong Blue Recovery Bond candidate fisheries.*

Candidacy	Fishery	Marine Ecoregion	Stock Health Score	Management Quality Score	Management Compliance Score	Management Units Score	Fisher Compliance Score	Combined Score
Poor	Blue crab *(Callinectes sapidus)*	North Atlantic Ocean (Mexico, Gulf of Mexico)	1	3	3	5	3	**3.00**
Fair	Orange roughy *(Hoplostethus atlanticus)*	South Pacific Ocean (East & South Rise)	1	5	5	5	4	**3.85**
Strong	Atlantic halibut *(Hippoglossus hippoglossus)*	North Atlantic Ocean (Gulf of Maine & Georges Bank)	5	5	5	5	4	**4.78**

Blue crab – North Atlantic Ocean

The Blue crab fishery operating in the North Atlantic Ocean was recognized to be a poor Blue Recovery Bond candidate because its stock is above sustainable levels, which implies there really is no need for the application of the Blue Recovery Bond recovery program.[22] The most recent stock assessment advises the establishment of long-term fishery objectives and management plans that include biological reference points, a harvest strategy and precautionary harvest control rules suitable for short-lived species.

Although basic crab fishery regulations (e.g., mandatory release of egg-bearing females or installation of escape mechanisms in the traps to allow undersized crabs to escape) have been recommended, they have not been implemented,[20] which is reflected in its poor management quality and compliance scores.

Orange roughy – South Pacific Ocean

The Orange roughy fishery in the South Pacific Ocean is a fair Blue Recovery Bond candidate. Some of the Orange roughy stocks in this marine ecoregion have experienced a long history of overfishing in the 1980s which led to a fishery collapse in the late 1990s.[23] Consequently, the total allowable catch was reduced substantially to allow for the stock to recover. Recovery for this species is challenging due to its life history traits - long-lived and slow growing, with low productivity. Now, some Orange roughy stocks are rebuilt and remain at target levels (between 30-50% of the virgin stock biomass) owing to a harvest strategy in place, whereas others remain overfished and require further recovery efforts,[23] hence the low stock health score. While vessel monitoring systems are in place to ensure fishers comply with management regulations across the entire fleet, there have been some issues of total catches surpassing catch limits and non-compliance issues in recent years,[24] which is reflected in the slightly lower fisher compliance score.

Atlantic Halibut – North Atlantic Ocean

The Atlantic halibut fishery is rated as a strong Blue Recovery Bond candidate based on a preliminary analysis. According to the most recent stocks assessment, the Atlantic halibut stock is overfished, but not subject to overfishing.[25] highlighting the potential for a Blue Recovery Bond recovery programme. Atlantic halibut is managed under the Northeast Multispecies (Groundfish) Fishery Management Plan (FMP). This FMP requires fishers to follow strict year-round and seasonal area closures, minimal size limits and annual catch limits, all based on the best available science.[25] The overfished stock status, implementation of appropriate management and adequate fisher compliance suggest the Atlantic Halibut fishery could be a strong Blue Recovery Bond candidate.

Methodological limitations

Blue recovery bonds present a unique and promising opportunity to promote the recovery and long-term sustainability of marine fish stocks through incentive-based resource management. Herein, we developed the basis for evaluating fishery Blue Recovery Bond candidacy. The framework presented provides a first attempt at designing a standardised framework that can be used by all types of fisheries.

The suggested framework is a useful starting point, but it is not fully proofed. The framework does require additional refinement that can likely be best developed through using the method on different case-specific examples in both small and large-scale fisheries in developed and undeveloped national contexts.

For this reason, we suggest that stakeholders who are interested in a higher resolution approach to evaluating their own fisheries use our interactive tool and contact Planet Tracker if they wish to discuss the weightings chosen.

While the framework herein provides a basis to evaluate fisheries for Blue Recovery Bond candidacy, there are several notable limitations:

- There is value in developing a standardised framework that can be applied to all types of fisheries to evaluate Blue Recovery Bond candidacy, yet it may come at the expense of dismissing the nuances of individual fisheries. Fisheries can vary considerably in nature especially when considering scale (small-scale versus large-scale) and level of economic development.
    - Consequently, some criteria may not completely relate to all fisheries that are interested in evaluating Blue Recovery Bond candidacy (for example, defined management units may not exist in certain fishery scenarios).
- The list of 19 criteria relies on a lot of information that is unlikely to be available from a single data source for a fishery.
    - Some of the 19 criteria can be bypassed because of correlation between criteria (our interactive tool allows the user to only answer the first nine most important questions if needed). It may still, however, be a lot to ask to accurately produce data for all the remaining ten criteria deemed to be the most important.
    - Such potential data limitation was clearly demonstrated when attempting to test the criteria from the refined list on a global scale. Using the FishSource global data required us to remove an additional four criteria from the refined list to evaluate Blue Recovery Bond candidacy across a range of fisheries in different regions.
- The global analysis reveals an important limitation of applying the framework at the global spatial scale.
    - Not only is it difficult to obtain all the data we suggest is needed to evaluate fisheries for Blue Recovery Bond candidacy, but the information collated in the FishSource global data likely relies on those fisheries having systems in place to provide such information (management requirements as well as data recording systems).
    - Consequently, fisheries included in the FishSource global data probably comprise a bias subset, likely excluding generally smaller-scale fisheries that are either economically less significant or that lack the necessary data to allow incorporation into the dataset.
      It is therefore prudent to rely on local knowledge of relevant stakeholders to evaluate such fisheries and adjust weightings of importance within the scorings accordingly.

ABOUT PLANET TRACKER

Planet Tracker is a non-profit financial think tank producing analytics and reports to align capital markets with planetary boundaries. Our mission is to create significant and irreversible transformation of global financial activities by 2030. By informing, enabling and mobilising the transformative power of capital markets we aim to deliver a financial system that is fully aligned with a net-zero, nature-positive economy. Planet Tracker proactively engages with financial institutions to drive change in their investment strategies. We ensure they know exactly what risk is built into their investments and identify opportunities from funding the systems transformations we advocate.

OCEANS PROGRAMME

The ongoing degradation of ocean ecosystems is mainly driven by the overexploitation of marine resources, as well as industrial practices destructive to ocean health, which capital markets indirectly support by focusing on short-term returns. These issues are further compounded by negative 'external' pressures (e.g., climate change), which capital markets fail to price in adequately. Through a combination of financial analytics and engagement with the financial community, Planet Tracker aims to ensure that the financial materiality of ocean ecosystems degradation is included in capital markets valuations in order to redirect their transformative power to ensure sustainable management of marine resources.

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